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October 21, 1981

To: Geothermal Advisory Committee Members

SUBJECT: Analysis of Infrastructure and Community Services Requirements for Geothermal Development in Puna District, Island of Hawaii

Gentlemen:

Provided herewith for your review and comment is Parsons initial scenario for the development of 50 MW of electrical power from geothermal resources in the Puna District of the Island of Hawaii. This 50 MWe scenario describes the low side of the development spectrum.

It is our intention to receive your comments and incorporate them into a second iteration of the 50 MWe scenario. We will then distribute the second scenario for additional review and comment and develop a third iteration of the scenario. Should major differences in reviewers' comments result from the second review, and if time permits, the third scenario iteration will be distributed for further review and comment. Our intent is to produce a final scenario with which most people agree and one upon which sound infrastructure and community services requirements planning can be based. Since the attached has been distributed to all members of the Governor's Geothermal Advisory Committee, as well as other parties currently involved in geothermal resource development or planning, we believe your comments will be extremely valuable in the development of a scenario that most accurately provides the planning information we require.

We fully realize that there are divergent views regarding full scale development of geothermal resources in Puna District. Therefore, as an aid to objectivity in the generation of the final scenario, all comments should be submitted anonymously and they will be so incorporated into the second iteration. This procedure is a commonly used technique that allows all views to be expressed and incorporated with a maximum of objectivity.

The assumptions upon which this 50 MWe scenario is based are the same as those for the 500 MWe scenario furnished to you on October 14, 1981, and are, therefore, not repeated here.

In order for us to maintain our rather tight work schedule, we would appreciate receiving your comments on the attached by October 30, 1981. Your continued cooperation in assisting us is appreciated.

Very truly yours,

PARSONS HAWAII

Gordon A. Chapman
Project Manager

GAC:jt

Attachment
As Noted

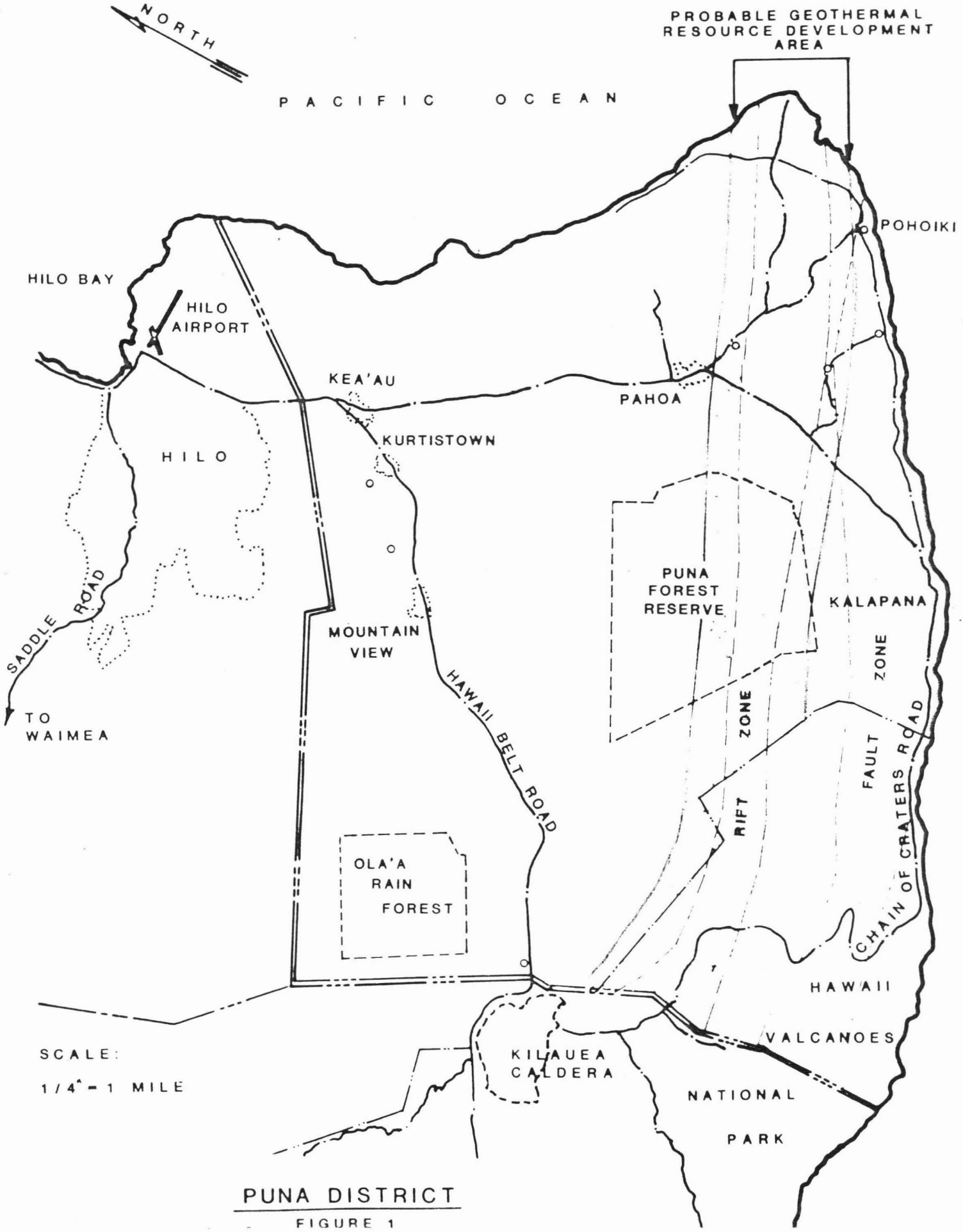
Scenario for the Development of
50 MW of Electrical Power
from Geothermal Energy Sources Located in the
Puna District of the Island of Hawaii

Scenario Begins

At the end of 1981, a development model wellhead generator was in place on the HPG-A well in the Puna District demonstrating power generation feasibility by producing 2.8 MW of usable power for the Hawaiian Electric Company (HECO). Concurrently, private developers were in the process of drilling additional wells to further confirm the availability of the geothermal resource, most of which was believed to be located within the probable geothermal resource development area outlined on Figure 1. Land lease acquisition by potential future developers proceeded apace.

As 1982 opened, the long term trends in energy use throughout the world indicated increased consumption at growth rates below what had been experienced in the decade of the 1970's. Increased oil prices and the application of energy conservation technology were causing decreasing rates of growth. It was clear to economic forecasters, however, that in the long run, the price of fuel oil energy would increase in relation to alternative source energy thereby making alternatives grow more competitive with time. Barring an unforeseen technological breakthrough, geothermal energy was predicted to become increasingly attractive in the Hawaii case at least until the turn of the century.

By mid-1982, geophysical surveys and the exploratory drilling program had confirmed the presence of enough geothermal energy to provide a minimum of 25 MW of power for local use on the Island of Hawaii. Drilling then commenced in earnest to develop the well field that would be needed for on-line steam production, well maintenance and water reinjection. Within two years, the drilling program was successful enough to warrant the start of development of a second well field for another 25 MW of power for local use in accordance with the schedule of events shown in Figure 2. The first

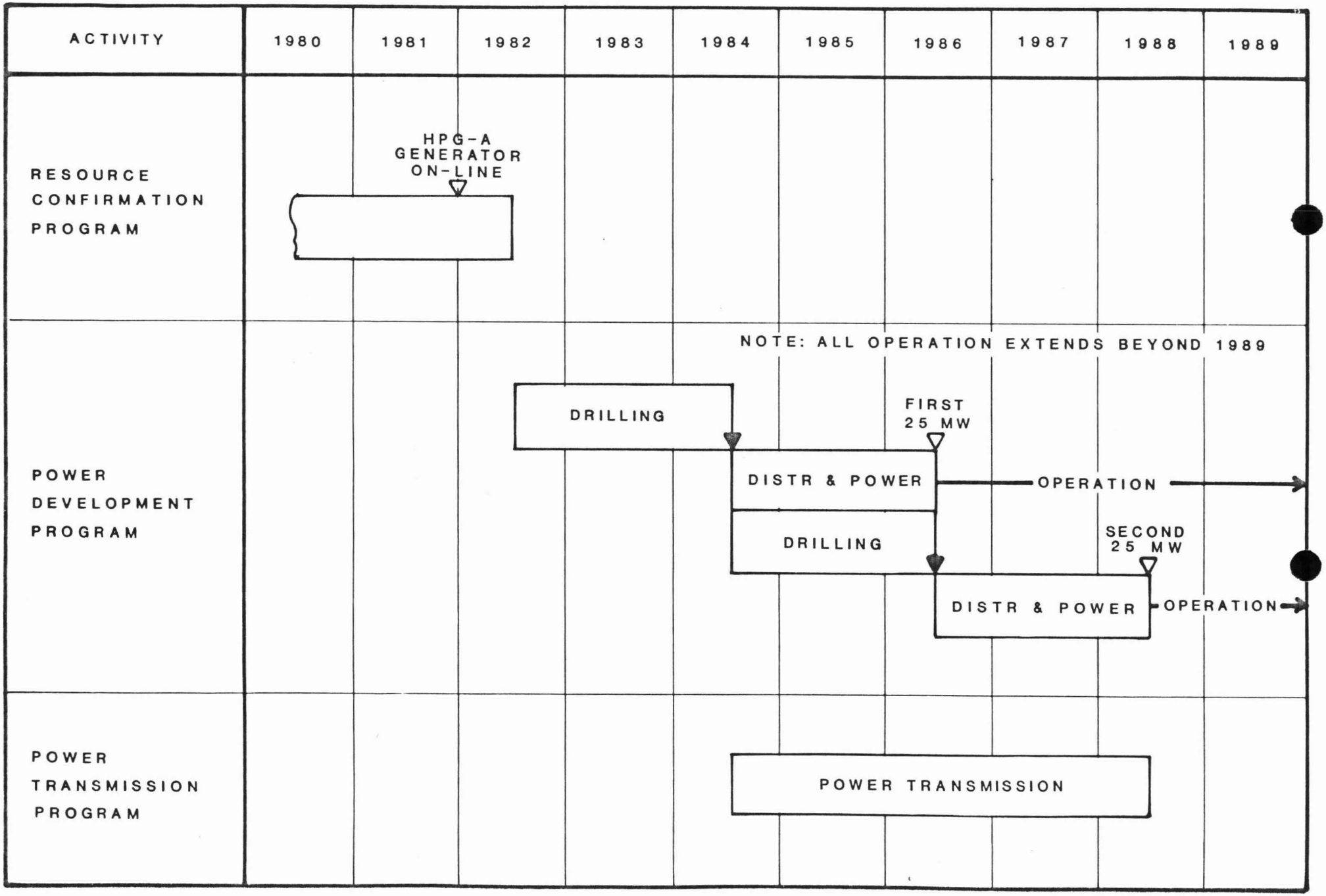


PUNA DISTRICT

FIGURE 1

FIGURE 2

SCHEDULE OF EVENTS - 50 MW SCENARIO



25 MW power station came on-line in mid-1986 at a time when it could be accepted as additional base load to HECO's system and the second 25 MW station was made active two years later after assigning existing HECO generating units to standby status.

In support of the local power development program, power transmission facility construction had begun by mid-1984. As the need arose, seaport facilities in Hilo and the highway system between Hilo and Puna were modified to accommodate the movement of heavy equipment for the 25 MW plants.

As development activity in Puna increased, construction workers and facility operating personnel associated with geothermal development migrated into the District at the rate indicated in Schedule A. They brought their families with them, and community services were expanded to meet the needs of the population influx.

Within six years of the start of drilling in earnest for the first 25 MW of power for local use, a total of 50 MW of electrical power was being generated from the geothermal resource located in the Puna District.

SCENARIO ENDS

SCHEDULE "A"

Geothermal Development - Requirements for Workers

50 MW SCENARIO

TYPE	YEAR								
	1981	1982	1983	1984	1985	1986	1987	1988	1989
Well Drilling	40	60	60	60	60	60	--	--	--
Gathering Field Construction	--	--	--	50	80	80	50	--	--
Power Station Construction	--	--	--	--	150	150	150	150	--
Power Transmission Construction	--	--	--	80	80	100	80	80	--
Facility Operation	--	--	--	--	30	30	(Continuing →) 50	50	50
TOTAL WORKERS	40	60	60	190	400	420	330	280	50